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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,380	12/12/2003	Henry S. Eilts	TI-35513	1690
23494	7590	11/06/2006	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			MOE, AUNG SOE	
			ART UNIT	PAPER NUMBER
			2618	

DATE MAILED: 11/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/735,380

Applicant(s)

EILTS ET AL.

Examiner

Aung S. Moe

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14, 20 and 21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14, 20 and 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Species I of Figs. 1A/1B & 3 readable on claims 1-14, 20 and 21 in the reply filed on 8/3/2006 is acknowledged. However, the Applicant did not distinctly and specifically point out the supposed errors in the restriction requirement. Further, the Applicant suggested that Species II of Fig. 2 might still be used in a MIMO system as shown in Figs. 1A and 1B. The Examiner agrees with the Applicant, thus, Species II should be considered as Figs. 1A/1B & 2. In any event, the Examiner believes that the restriction requirement is proper because the species I (Figs. 1A/1B & 3), species II (Figs. 1A/1B & 2) and species III (Figs. 1A/1B & 4) are independent and distinct because they are disclosed in the specification and drawings as being embodied in multiple patentably distinct embodiments.

The requirement is still deemed proper and is therefore made FINAL.

### ***Specification***

2. The abstract of the disclosure is objected to because legal phraseology often used in patent claims, such as "comprises" should be avoided. Please change "comprises" recited in the abstract to - - includes - -. Correction is required. See MPEP § 608.01(b).

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4, 5 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 4, 5 and 9, it is unclear how “a calibration signal” recited in line 1 of both claims 4, 5 and 9 related to “a calibration signal” recited in claim 1? If there are the same “calibration signal”, please change “a calibration signal” recited in line 1 of both claims 4, 5 and 9 to - - said calibration signal - -.

5. Claims 20 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is noted that claim 20 recites both an apparatus and method steps of using the apparatus, thus, claim 20 is indefinite and ambiguous because claim 20 is directed to neither a “process” nor a “machine”, but rather embraces or overlaps two different statutory classes of invention.

For the purpose of examining, the Examiner is given claims 20-21 a broadest reasonable interpretation.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-8, 10-14 and 20-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Vaidyanathan et al. (U.S. 7,031,669).

Regarding claim 1, Vaidyanathan '669 discloses a method for calibrating an AGC (i.e., See Fig. 3; noted the use of variable gain amplifiers in the transceiver as discussed in col. 7, lines 44+) in a MIMO-based system (i.e., see Figs. 1, 4 and 5; col. 3, lines 10+), the process comprising: transmitting a calibration signal (i.e., noted the transmission a calibration signal from the first transmitter 120/110 as shown in Figs. 1, 4 and 5; see col. 4, lines 1-40, col. 5, lines 25+, col. 7, lines 20+, col. 9, lines 5+ and col. 11, lines 30+); receiving the calibration signal (i.e., noted the receiving a calibration signal from the first transmitter 120/110(1) at the receiver 135/110(2) as shown in Figs. 1, 4 and 5; see col. 4, lines 1-40, col. 5, lines 25+, col. 7, lines 20+, col. 9, lines 5+ and col. 11, lines 30+); decoding the calibration signal to produce a measurement (i.e., as shown in Figs. 4 & 5 and further discussed in Steps 1-7 and Steps 1-5 in columns 9 and 11, the signal received at the receiver 135 is respectively decoded to produce a measurement for performing calibration/correction); storing the measurement (i.e., as shown in Fig. 3, the measurement values are stored in the memory 165; see col. 7, lines 45, col. 9, lines 64+, col. 10,

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lines 25+, and col. 12, lines 12+); changing an AGC gain setting (i.e., col. 7, lines 45+, col. 10, lines 1-40 and col. 12, lines 1-45); and repeating the transmitting, receiving, decoding, storing, and changing operations (i.e., as shown in Figs. 3, 4 & 5 and further discussed in Steps 1-7 and Steps 1-5 in columns 9 and 11, transmitting, receiving, decoding, storing and changing as shown in Steps 1-7 and 1-5 of Figs. 4 and 5 are repeated respectively).

Regarding claim 2, Vaidyanathan '669 discloses wherein the transmitting, receiving, decoding, storing, and changing operations are performed by a single multiple-input-multiple-output (MIMO) wireless device (i.e., Fig. 4 and col. 8, lines 40+).

Regarding claim 3, Vaidyanathan '669 discloses wherein the transmitting, receiving, decoding, storing, and changing operations are performed for each AGC gain setting.

Regarding claim 4, Vaidyanathan '669 discloses wherein transmitting a calibration signal comprises transmitting a single frequency centered on a fast Fourier transformer bin (i.e., noted the use of FFT shown in Fig. 5 of the OFDM system; and noted the use of single frequency centered on a FFT for an OFDM scheme as shown in Fig. 5; see col. 14, lines 5+).

Regarding claim 5, Vaidyanathan '669 discloses further comprising generating a calibration signal by applying a non-zero coefficient to an inverse fast Fourier transformer (i.e., noted the non-zero coefficient  $C(k)$  applied to the multipliers 197 before the IFFT as shown in the OFDM system of Fig. 5).

Regarding claim 6, Vaidyanathan '669 discloses wherein decoding the calibration signal comprises using a fast Fourier transformer (i.e., noted the use of FFT shown in Fig. 5 of the OFDM system).

Regarding claim 7, Vaidyanathan '669 discloses further comprising accessing the measurement to improve AGC performance (i.e., noted the improvement of the AGC performance as discussed in col. 5, lines 15+ and col. 7, lines 20-68).

Regarding claim 8, Vaidyanathan '669 discloses further comprising normalizing the measurement (i.e., as discussed in col. 4, lines 20+ that the normalizing the measurement for obtaining power to unity).

Regarding claim 10, Vaidyanathan '669 discloses a MIMO-based system (i.e., see Figs. 1, 4 and 5; col. 3, lines 10+) comprising an AGC, wherein the AGC is calibrated by way of an iterative process (i.e., See Fig. 3; noted the use of variable gain amplifiers in the transceiver as discussed in col. 7, lines 44+), the iterative process comprising:

transmitting a calibration signal (i.e., noted the transmission a calibration signal from the first transmitter 120/110 as shown in Figs. 1, 4 and 5; see col. 4, lines 1-40, col. 5, lines 25+, col. 7, lines 20+, col. 9, lines 5+ and col. 11, lines 30+); receiving the calibration signal (i.e., noted the receiving a calibration signal from the first transmitter 120/110(1) at the receiver 135/110(2) as shown in Figs. 1, 4 and 5; see col. 4, lines 1-40, col. 5, lines 25+, col. 7, lines 20+, col. 9, lines 5+ and col. 11, lines 30+); decoding the calibration signal to produce measurements (i.e., as shown in Figs. 4 & 5 and further discussed in Steps 1-7 and Steps 1-5 in columns 9 and 11, the signal received at the receiver 135 is respectively decoded to produce a measurement for performing calibration/correction); storing the measurements (i.e., as shown in Fig. 3, the measurement values are stored in the memory 165; see col. 7, lines 45, col. 9, lines 64+, col. 10, lines 25+, and col. 12, lines 12+); and changing an AGC gain setting (i.e., as shown in Figs. 3, 4

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& 5 and further discussed in Steps 1-7 and Steps 1-5 in columns 9 and 11, transmitting, receiving, decoding, storing and changing as shown in Steps 1-7 and 1-5 of Figs. 4 and 5 are repeated respectively).

Regarding claim 11, Vaidyanathan '669 discloses wherein the iterative process is repeated for each AGC gain setting (i.e., as shown in Figs. 3, 4 & 5 and further discussed in Steps 1-7 and Steps 1-5 in columns 9 and 11, transmitting, receiving, decoding, storing and changing as shown in Steps 1-7 and 1-5 of Figs. 4 and 5 are repeated respectively).

Regarding claim 12, Vaidyanathan '669 discloses wherein the AGC comprises a controller (i.e., Fig. 3, the controller 170) and at least one adjustable gain amplifier (i.e., see col. 5, lines 15+ and col. 7, lines 40+).

Regarding claim 13, Vaidyanathan '669 discloses wherein the calibration signal comprises a single frequency centered on a fast Fourier transformer bin (i.e., noted the use of single frequency centered on a FFT for an OFDM scheme as shown in Fig. 5; see col. 14, lines 5+).

Regarding claim 14, Vaidyanathan '669 discloses wherein the measurements are used to improve performance of the system (i.e. the calibration/correction as shown in steps 1-7 and 1-5 of Figs. 4 and 5 clearly improve performance of the system).

Regarding claim 20, It is noted that claim 20 corresponds to the claims 1-8 and 10-14 as discussed above, thus, claim 20 is rejected for the same reasons as discussed for claims 1-8 and 10-14 above.



Regarding claim 21, Vaidyanathan '669 discloses wherein the AGC comprises a controller and at least one adjustable gain amplifier (i.e., see claim 12 as discussed above).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vaidyanathan '669 in view of Tellado et al. (U.S. 2004/0198276 A1).

Regarding claim 9, it is noted that although Vaidyanathan '669 shown the step of transmitting a calibration signal by using OFDM scheme in the MIMO system, Vaidyanathan '669 does not explicitly show prepending a cyclic prefix to the calibration signal.

However, Tellado '275 teaches that it's conventionally known in the OFDM system that data is transmitted in bursts, and each burst consists of a cyclic prefix followed by data symbols and/or data symbols followed by a cyclic suffix, and Tellado '275 further teaches prepending a cyclic prefix to the calibration signal is known to one having ordinary skill in the art at the time of the invention was made (i.e., see paragraphs 0066-0072).

In view of the above, having the system of Vaidyanathan '669 and then given the well-established teaching of Tellado '275, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Vaidyanathan '669 as taught by Tellado '275, since Tellado '275 stated in paragraphs 0018 such a modification would minimize the effects of noise and distortion in the receiver.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 20040252632A1 US 20040082356A1 US 20050135403A1 US 20050128953A1

US 20050047384A1 US 20040120411A1 US 20060239370A1 US 20040106381A1


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US 20040085939A1

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aung S. Moe whose telephone number is 571-272-7314. The examiner can normally be reached on Flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F. Urban can be reached on 571-272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Aung S. Moe  
Primary Examiner  
Art Unit 2618

A. Moe  
October 28, 2006